

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 00000PCT7502	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/JP2004/016796	International filing date ( <i>day/month/year</i> ) 05 November 2004 (05.11.2004)	Priority date ( <i>day/month/year</i> ) 14 November 2003 (14.11.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant SEMICONDUCTOR ENERGY LABORATORY CO., LTD.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input checked="" type="checkbox"/> | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application   |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. +41 22 740 14 35	Date of issuance of this report 15 May 2006 (15.05.2006)  Authorized officer  <div style="text-align: center; font-weight: bold; font-size: 1.2em;">Masashi Honda</div>  Telephone No. +41 22 338 70 10
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# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

REC'D 10 FEB 2005

PCT  
WIPO PCT

To:  
**SEMICONDUCTOR ENERGY  
LABORATORY CO., LTD.**  
  
**398, Hase, Atsugi-shi,  
Kanagawa 2430036  
Japan**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year) **08.02.2005**

Applicant's or agent's file reference  
**00000PCT7502**

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
**PCT/JP2004/016796**

International filing date (day/month/year)  
**05.11.2004**

Priority date (day/month/year)  
**14.11.2003**

International Patent Classification (IPC) or both national classification and IPC  
Int.Cl. **H01L29/786**

Applicant  
**SEMICONDUCTOR ENERGY LABORATORY CO., LTD.**

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Date of completion of this opinion

**25.01.2005**

Name and mailing address of the ISA/JP

**Japan Patent Office**

**3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan**

Authorized officer

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**4L 9361**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/016796

Box No. I

Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2004/ 016796

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:

- ☐ paid additional fees  
☐ paid additional fees under protest  
☒ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

☐ complied with

☒ not complied with for the following reasons:

The inventions of claims 1-6 are linked to be one another only in respect of the feature "at least one electrode is formed by a droplet discharge method". However, this feature is disclosed in a prior art document JP 2003-098548 A (HITACHI, LTD.), 2003.04.03. So the feature cannot be a special technical feature.

And there exists no special technical feature linking the inventions of claims 1-6 as to form a single general inventive concept among the inventions.

Therefore there are no technical relationship which is considered as "special technical feature" (PCT rule 13.2) among the claims 1-6. So this application contains the following groups of invention which are not so linked as to form a single inventive concept under PCT rule 13.2.

Group I: Claims 1-4, 7-10  
Group II: Claims 5-6

4. Consequently, this opinion has been established in respect of the following parts of the international application:

- ☐ all parts.  
☒ the parts relating to claims Nos. 1-4, 7-10

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

**PCT/JP2004/ 016796**

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims	<u>1-4, 7-10</u>	YES
	Claims	_____	NO
Inventive step (IS)	Claims	_____	YES
	Claims	<u>1-4, 7-10</u>	NO
Industrial applicability (IA)	Claims	<u>1-4, 7-10</u>	YES
	Claims	_____	NO

**2. Citations and explanations**

D1: JP 2002-217421 A(SEMICONDUCTOR ENERGY LABORATORY CO., LTD.),  
2002.08.02, paragraphs [0021]-[0031], fig.1 (Family: none)  
D2: JP 2003-098548 A(HITACHI, LTD.), 2003.04.03, paragraph [0016] (Family: none)  
D3: JP 05-119351 A(SANYO ELECTRIC CO., LTD.), 1993.05.18,  
paragraphs [0002]-[0005], fig.7-12 (Family: none)  
D4: JP 2003-059940 A(FUJI PHOTO FILM CO., LTD.),  
2003.02.28, paragraphs [0022]-[0030](Family: none)  
D5: JP 2003-241177 A(DAI NIPPON PRINTING CO., LTD), 2003.08.27,  
paragraphs [0015]-[0032] (Family: none)  
D6: JP 2003-149831 A(SEIKO EPSON CORPORATION), 2003.05.21,  
paragraphs [0036]-[0045], fig.1 (Family: none)

**Claims 1-3**

The subject matters of claims 1, 2 and 3 do not appear to involve an inventive step in view of D1 and D2. D1 discloses a method for manufacturing a liquid crystal display device, comprising the steps of: forming a first electrode over a substrate; forming a first insulating film to cover the first electrode; forming a first semiconductor layer over the insulating film; forming a second insulating film over the first semiconductor layer to overlap the first electrode; forming an n-type second semiconductor layer to cover the second insulating film; patterning the first and second semiconductor layers into an island shape; forming a second and a third electrodes over the second semiconductor layer; etching the second semiconductor layer using the second and the third electrodes as a mask to be separated forming a fourth electrode to be in contact with the third electrode. D2 discloses a step of forming electrode by droplet discharge method. The thin film transistors in D1 and D2 are concerned with mutually related technical fields. Therefore, the skilled person in the art would easily conceive the idea of applying the technical feature employed in D2 to the invention disclosed in D1.

**Claim 4**

The subject matter of claim 4 does not appear to involve an inventive step in view of D1, D2 and D3. D1 discloses a method for manufacturing a liquid crystal display device, comprising the steps of: forming a first electrode over a substrate; forming a first insulating film to cover the first electrode; forming a first semiconductor layer over the first insulating film; forming a second insulating film over the first semiconductor layer to overlap the first electrode; forming an n-type second semiconductor layer to cover the

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.  
Continuation of: V. 2

second insulating film; patterning the first and second semiconductor layers into an island shape; forming a third and a forth electrodes over the second semiconductor layer; etching the second semiconductor layer using the third and the forth electrodes as a mask to be separated. D3 discloses a step of forming a second electrode between the first insulating film and the first semiconductor layer. D2 discloses a step of forming electrode by droplet discharge method. The thin film transistors in D1, D2 and D3 are concerned with mutually related technical fields. Therefore, the skilled person in the art would easily conceive the idea of applying the technical features employed in D2 and D3 to the invention disclosed in D1.

Claims 7-8

The subject matters of claims 7 and 8 do not appear to involve an inventive step in view of D1, D2, D3, D4, D5 and D6. D4, D5 and D6 disclose base treatment before forming electrode. The methods for manufacturing a liquid crystal display device in D1, D2, D3, D4, D5 and D6 are concerned with mutually related technical fields. Therefore, the skilled person in the art would easily conceive the idea of applying the technical features employed in D2, D3, D4, D5 and D6 to the invention disclosed in D1.

Claim 9

The subject matter of claim 9 does not appear to involve an inventive step in view of D1, D2, D3 and D5. D5 discloses substance having photocatalytic function. The methods for manufacturing a liquid crystal display device in D1, D2, D3 and D5 are concerned with mutually related technical fields. Therefore, the skilled person in the art would easily conceive the idea of applying the technical features employed in D2, D3 and D5 to the invention disclosed in D1.

Claim 10

The subject matter of claim 10 does not appear to involve an inventive step in view of D1, D2, D3 and D6. D6 discloses plasma treatment as base treatment on a formation face to be liquid-repellent. The method for manufacturing a liquid crystal display device in D1, D2, D3 and D6 are concerned with mutually related technical fields. Therefore, the skilled person in the art would easily conceive the idea of applying the technical features employed in D2, D3, and D6 to the invention disclosed in D1.